RMT®
Integrated Environmental Solutions

2025 E. Beltline Ave. SE, Suite 402
Grand Rapids, MI 49546
Telephone: 616-975-5415
Fax: 616-975-1098

Andy - Same as previous report, Can you prioritize this too? Stephen

May 24, 2001

Mrs. Gwen Zervas
Case Manager
New Jersey Department of Environmental Protection
Bureau of Federal Case Management
Division of Responsible Site Party Remediation
CN 028
Trenton, NJ 08625-0028

Subject: L.E. Carpenter & Company (LEC), Wharton, New Jersey
Enhancement of Free Product Recovery

Dear Mrs. Zervas:

RMT, Inc. has prepared this work plan on behalf of LEC to respond to the comments outlined in your letter dated May 8, 2001. According to that letter, a revised work plan for evaluating enhancement of free-product (FP) recovery must be submitted to NJDEP and the United States Environmental Protection Agency (USEPA) no later than May 25, 2001. Recovery of FP is currently taking place via the existing EFR system per the existing Record of Decision (ROD) dated April 1994. This workplan does not represent a change in the ROD with respect to free product recovery, but does address NJDEP/USEPA concerns regarding expediting FP recovery. Rather than performing a series of time-consuming technology evaluations and feasibility studies, LEC will implement a proven recovery technology as outlined below. This workplan presents a conceptual design of a recovery trench that will expedite recovery of the remaining FP. In addition, the proposed trench design is flexible enough to allow, if necessary, a transition from passive-flow recovery, to active pumping, perhaps coupled with injection of various materials for enhancing FP transport rates into the trench.

Background

In August 1997, the NJDEP approved the Remedial Action Plan, which called for removal of FP from the eastern portion of the site using enhanced fluid recovery (EFR). In May 2000 RMT submitted a report to L.E. Carpenter (LEC) titled *Free Product Volume Analysis.* That report estimated the total volume of light non-aqueous phase liquids (LNAPL's) to be approximately 44,000 gallons. The report also estimated the volume of recoverable LNAPL to range from 8,000 and 13,000 gallons.

Since November of 1997, EFR efforts have removed 2,942 gallons of LNAPL from the 28 extraction wells on the site. Recovery has generally slowed from an initial volume of 250 gallons per month to less than 50 gallons per month. Given the low rate of recovery, it would take up to 20 years to recover the FP. It is LEC's intent to significantly accelerate the rate and efficiency of FP removal.

Objectives

The objective of this work plan is to provide a cost-effective approach to expedite removal of LNAPL from the subsurface. There are few technologies available to address free-product removal of di(2-ethylhexyl)phthalate (DEHP) other than by physical extraction from the host matrix. Instead of performing additional detailed technology screening and analyses along with time consuming pilot studies, LEC will focus on proven and more robust conventional applications that would accelerate the FP recovery and address site conditions and limitations including:

- shallow depth to the floating free product and groundwater.
- heterogeneous lithology of alluvial soils.
- management of waste soils contaminated with LNAPL generated during construction.
- disposal of contaminated groundwater generated during construction and later operations.
- health and safety of remediation workers and neighbors.
- viscosity of DEHP.

This work plan describes the conceptual design for a capture trench technology to expedite removal of free product from the LEC site located in Wharton, New Jersey (Figure 1).

Approach Rationale

The primary reason for the current low rate of FP recovery is the viscosity and density of the LNAPL and the surface tension generated between the generally fine-grained soil particles in the contaminated soil zone. The problem is similar to one of dewatering low permeability soils. An insufficient cone of depression often develops between well spacing in those soils. In this case an inordinately large number of wells is required to provide sufficient surface area for the free product to migrate and displace the water in the well column. However, by significantly increasing the surface area of the "collector" the flow of product would be increased. This would best be achieved by installation of a collection trench similar to a french-drain used to de-water saturated fine-grained soils.

Installation of a trench is feasible at this site due to the shallow nature of the contaminant and water table. The technology is robust in that it will intercept all contaminant-bearing strata regardless of lithology, thus allowing for trapped product to flow into the trench drain media.

The elongated geometry of the free-product zone also maximizes the efficiency of using a trench. The current design concept calls for installing the trench through the axis of this zone and inducing flow of free product under passive conditions to the trench from the entire zone. No flow modeling has been recommended for this design, as the variability and uncertainty of stratigraphic and flow parameters would outweigh any confidence in the model.

Conceptual Design

General

The scope of this project involves the installation of an interceptor trench network approximately 400 feet in total length, 16 feet deep, and approximately 4 feet wide at its base (Figure 2). The location of the interceptor trench with respect to measured FP is shown on Figure 3. The interceptor trenches construction will include three clean-outs at the dead ends, and three manhole/collection-sump structures equipped with float-regulated submersible product pumps that will pump to an aboveground recovery tank for disposal at an approved facility.

The conceptual design calls for conventional trenching methodology using trench shields and/or sheeting. This would allow for controlled installation of filter fabric, piping and select backfill materials. Given the apparent presence of rubble and boulders in the shallow zone, this method also allows for removal of those objects with a backhoe. The focus of the design will be on minimizing the production of materials requiring treatment and/or off-site disposal.

Trench Installation

The construction of the interceptor trench will begin with the installation of the first manhole/collection-sump section. This will be accomplished by excavating to a depth of twenty-one feet below grade and installing a 1-foot thick gravel footer. The excavation around the manhole location will be supported with road plates, as necessary, to maintain a stable excavation. Once the base section has been set into place, a trench box will be installed in the excavation along the alignment of the trench, against the base section. This will allow personnel to enter the trench and make the connection between the piping and the manhole/leach section. As the excavation progresses, the trench box will be pulled along and used to support the excavation. The HDPE piping and backfill will exit the rear of the trench box as the excavation advances. Spoil generated from the trench will be staged adjacent to the excavation.

In general, there are two 6-inch perforated HDPE pipes running between the structures. One at approximately 16 feet below grade and a second line approximately 6 feet below grade. The deeper line will be installed first. The line will be bedded in approximately 6-inches of material and backfilled with pea gravel before the trench box is moved away from the manhole/leach structure. The grade of the lower pipe will be maintained with a depth master laser guided survey instrument attached to the stick of the excavator. The depth master device is a laser level that allows the operator of the excavator to set the elevation of the pipe bedding to a predetermined grade. Once this grade is set, the piping is laid into the trench from the surface of the excavation and backfilled into place, thus limiting the exposure of personnel entering the trench. RMT will obtain relatively permeable pea gravel and coordinate placement as backfill into the trench with a rubber-tired loader. To promote flow to the manhole sumps, the grade slope of the trench bottom and lower pipe will be from the outer ends of the system toward Manholes (MH-1 and MH-2), respectively. The slope of the upper perforated pipe will be the reverse, sloping outward to provide for distribution of injected fluids, if deemed necessary.

The trench will be initially backfilled to the invert elevation of the second HDPE line, approximately 6-feet below ground surface. At this point, the sides of the excavation will be cut back so that personnel can enter the trench and lay the upper line. The invert elevation of the second line will be controlled by the use of a horizontal plane laser and a sensor attached to a grade rod. Once the proper invert elevation has been achieved, the top of the pipe will be covered with about 1-foot of pea gravel. A geotextile fabric will be placed over the top of the trench approximately 5 feet below grade. Spoil from the trench will then be used to cap the upper 5 feet of the trench.

Manhole Installation

Concrete manholes with leach sections will be installed along the trench at locations shown on Figure 3. These would be installed up to a depth of 20 feet and be provided with geotextile wrapped leach sections windowed to the saturated thickness of the trench backfill medium. This will allow for free passage and collection of floating product in the manhole sumps, regardless of water-table conditions. The free product would then be pumped by a float-regulated submersible product-pump to an aboveground recovery tank for disposal at an approved facility.

Groundwater

Pumping from the manhole/leach sections will control groundwater encountered during the installation. To facilitate groundwater pumping RMT shall maintain a storage capacity of 80,000 gallons in the form of frac tanks on site. The groundwater will be pumped from the manholes to the frac tanks. Frac tank contents will be transported by a licensed hazardous waste hauler to a facility licensed to handle the stored waste.

Existing EFR Wells

RMT will make every effort to preserve existing monitoring and EFR wells during construction of the recovery trench. Existing wells will be used to monitor the effectiveness of the recovery trench. It may become necessary to remove some wells because of trench construction. In that case, they will be abandoned according to appropriate well abandonment guidelines.

Design Contingencies

RMT believes that this design will significantly increase the monthly volume of product recovered from the free-product zone while operating under passive conditions. In the event that induced water-table drawdown or other augmented remediation efforts become necessary, we designed the system with two horizontal perforated pipes (Figure 2). The lower pipeline would allow a sufficient flow in the event that a groundwater extraction pump is required in the trench.

The second perforated pipe installed at the top of the lower trench segment would be multifunctional. This pipe would serve as a potential recharge system for treated water, or provide a means of injecting surfactants or bionutrients to polish or remove residual contamination from the soil after removal of free product has been accomplished.

Disposition of Excavation Derived Materials

RMT will remove and stockpile the upper trench material (about the uppermost 5 feet of soil) and replace that material back in and over the upper trench section during completion. Excess contaminated soils from the manhole excavations shall be loaded directly to three axle trailers and transported to an appropriate licensed waste disposal area. RMT anticipates that any excess soils from the saturated zone generated while excavating the manholes will have to be disposed of as hazardous waste.

The conceptual design for disposition of materials generated during excavation of the lower trench calls for replacement of those soils within the upper trench segment while backfilling of the lower trench is taking place (see Figure 2). This soil would then be covered and contained in place by the materials excavated from the upper trench.

Contaminated groundwater generated during construction will be pumped to frac tanks, treated through carbon absorption units, and then released via an NPDES approved discharge or to the POTW system.

Schedule

RMT estimates completion of trench construction within one month of notice to proceed depending on the availability of subcontractors and weather conditions. Completion of electrical, pumping facilities and tankage would take an additional month.

If you have any questions or comments regarding this work plan, please call me at (616) 975-5415 or Nick Clevett at (312) 575-0200.

Sincerely,

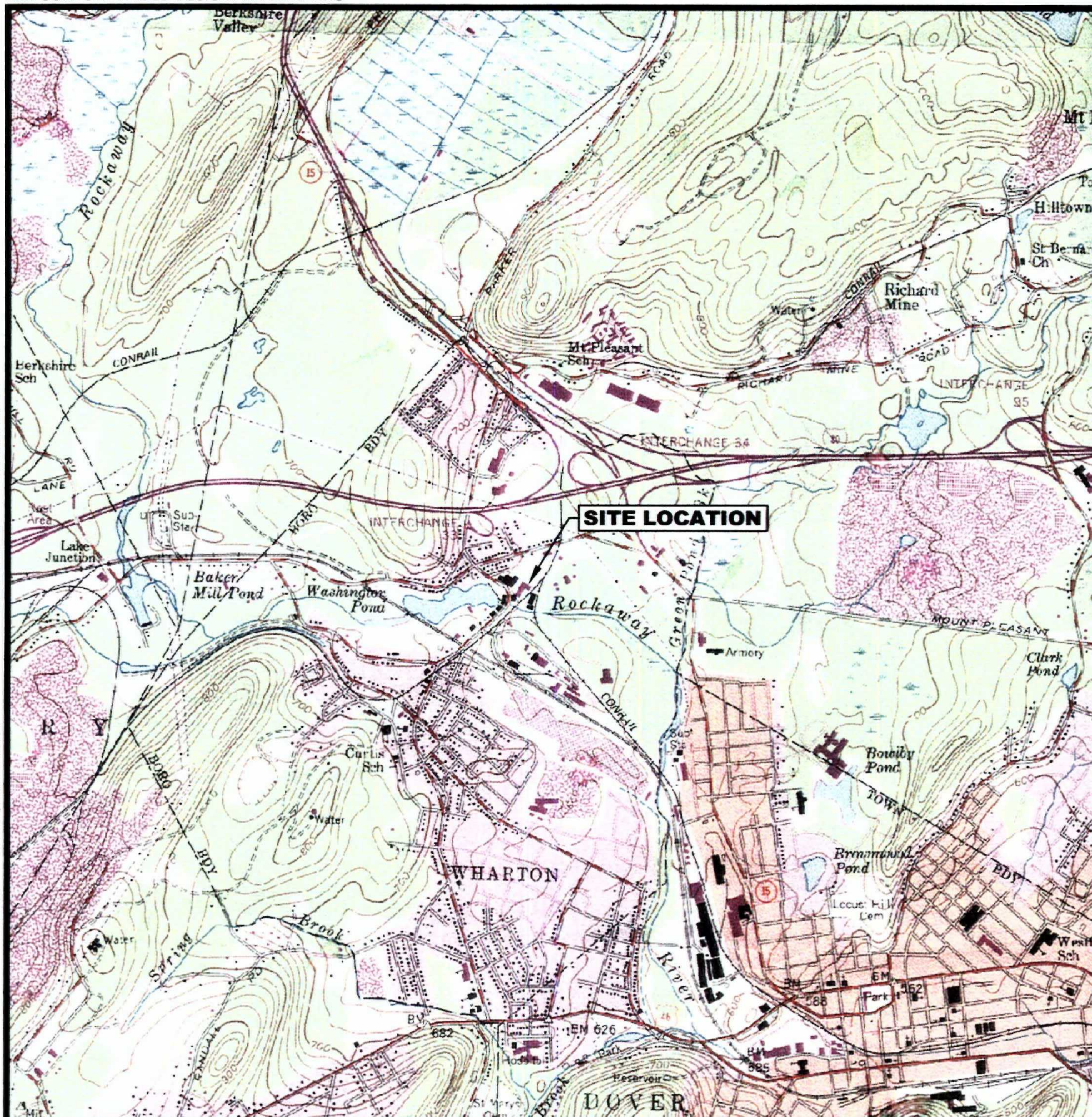
RMT, Inc.

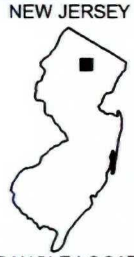
James J. Dexter, C.P.G.
Project Director

Attachments: Figure 1 – Site Location Map
Figure 2 – Conceptual Drawing (French Drain)
Figure 3 – Product Collection Trench Plan

cc: Cris Anderson, LE Carpenter
Nick Clevett, RMT-Chicago
Drew Diefendorf, RMT-Ann Arbor
Wally Kurzeja, RMT-Ann Arbor
Central Files (2)

RMT COMPUTER AIDED DESIGN AND DRAFTING



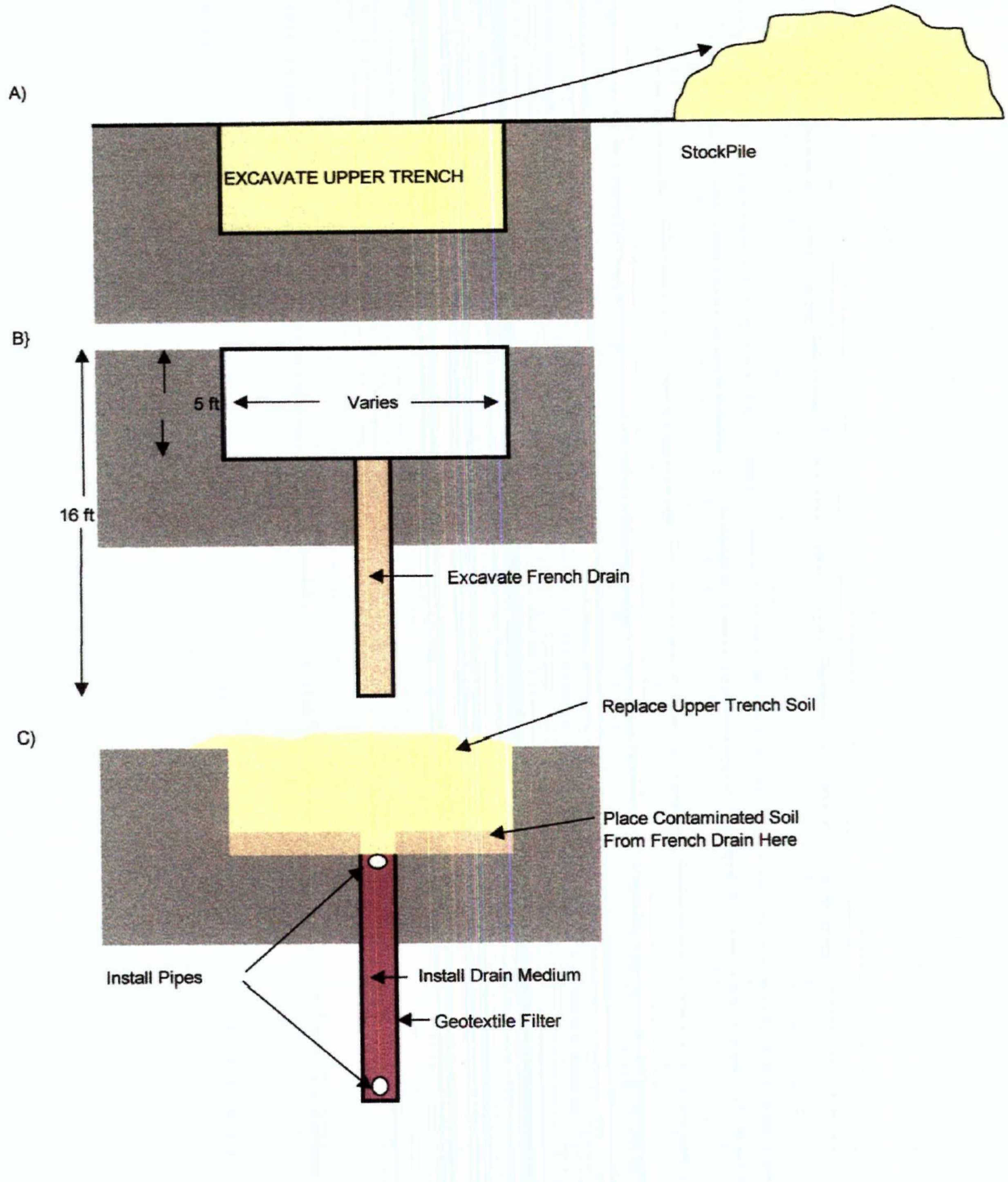
SOURCE 1. BASE MAP DEVELOPED FROM THE DOVER, NEW JERSEY 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1954, PHOTOREVISED 1981.	NEW JERSEY  QUADRANGLE LOCATION	N 0 2000' 4000' APPROXIMATE SCALE IN FEET

RMT INC.®	**LE CARPENTER** **WHARTON, NEW JERSEY**	DRAWN BY:	SJL
		APPROVED BY:	NC
		PROJECT NUMBER:	3868.23
	SITE LOCATION MAP	FILE NUMBER:	38682300.DWG
		DATE:	MAY 2001

FIGURE 1

PLOT DATA
Drawing Name: J:\03868\23\38682300.dwg
Operator Name: lucidos
Scale: 1"=2000'
Dwg Size: 80344 Bytes
Plot Date: Thursday, April 26, 2001
Plot Time: 12:00.0825 PM
Attached Xrefs: No xref's Attached.

RMT COMPUTER AIDED DESIGN AND DRAFTING



PLOT DATA
Drawing Name: J:\03868\23\38682305.dwg
Operator Name: lucidos
Scale: 1"=2000'
Dwg Size: 86002 Bytes
Plot Date: Wednesday, May 23, 2001
Plot Time: 11:57.5244 AM
Attached Xrefs: No xref's Attached.

RMT INC.

LE CARPENTER
WHARTON, NEW JERSEY

CONCEPTUAL DRAWING - FRENCH DRAIN

DRAWN BY:	SJL
APPROVED BY:	JDD
PROJECT NUMBER:	3868.23
FILE NUMBER:	38682305.DWG
DATE:	MAY 2001

FIGURE 2

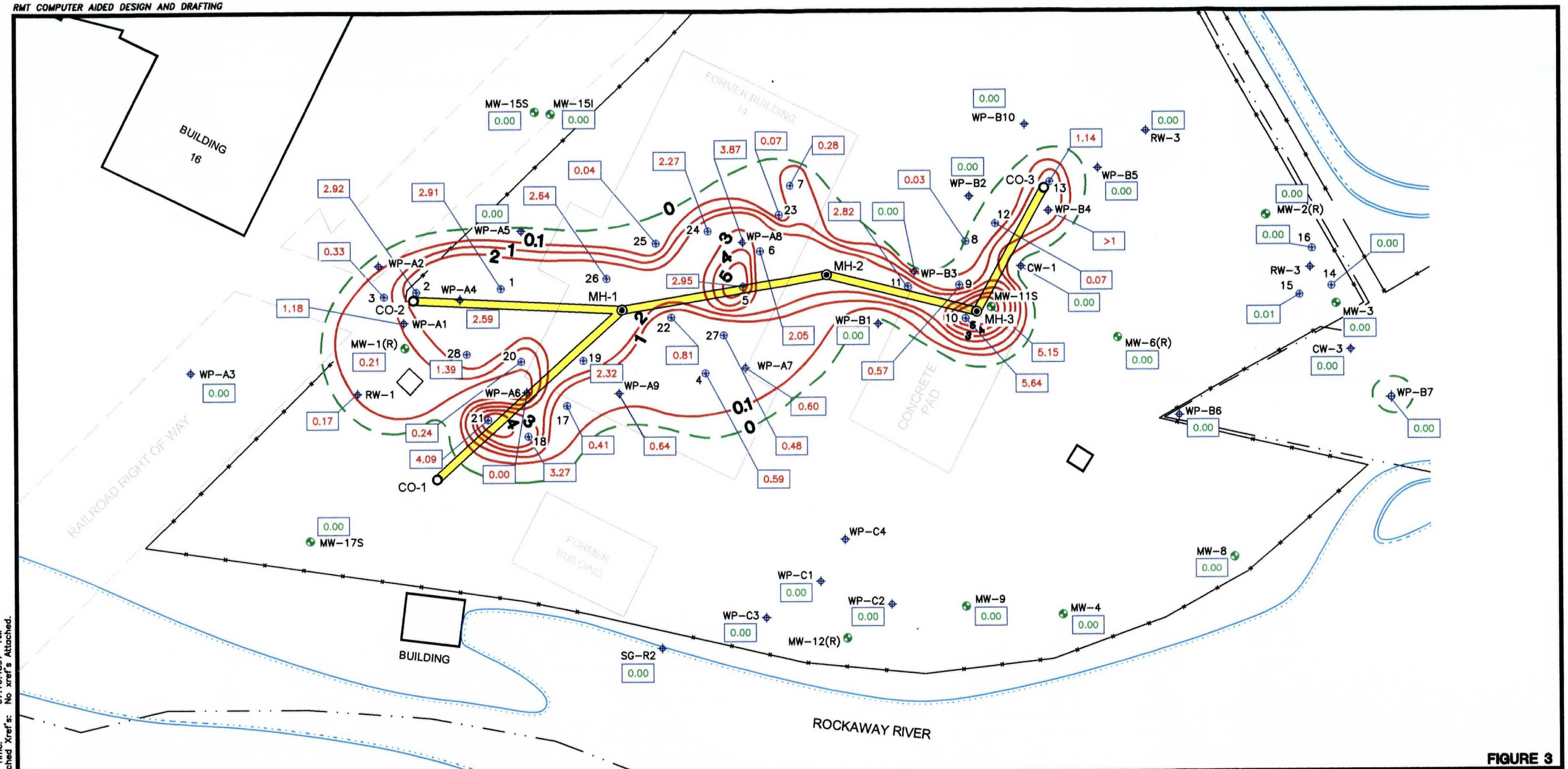


FIGURE 3

LEGEND

- SURFACE WATER FEATURE
- PROPERTY LINE
- FENCE
- 1 PRODUCT THICKNESS CONTOURS (FT)
- 0 APPROXIMATE OUTER LIMIT OF FREE PRODUCT
- 0.00 NO MEASURABLE PRODUCT
- 1.22 PRODUCT THICKNESS MEASURED IN WELL (FT) (Measurements collected at monitoring wells and well points on February 27, 2001 by STL Edison) (Measurements collected at EFR wells on March 15, 2001 by CEMCO)
- MW-13S MONITORING WELL
- MW-24 ABANDONED WELL
- RW-2 RECOVERY WELL
- CW-3 CAISSON WELLS
- WP-B7 WELL POINTS WITH ELEVATION
- TREATMENT BUILDING
- 13 ENHANCED FLUID RECOVERY WELL (EFR)
- MH-2 COLLECTION SUMP AND MANHOLE
- CO-1 CLEANOUT LOCATION AND NUMBER
- COLLECTION TRENCH

N

0 50' 100'

SCALE IN FEET

L.E. CARPENTER
WHARTON, NEW JERSEY

PRODUCT COLLECTION TRENCH PLAN

DRAWN BY:	SJL	PROJECT NUMBER:	3868.22
CHECKED BY:	JDD	FILE NUMBER:	38682205.DWG
APPROVED BY:	DD	DATE:	MAY 2001

RMT INC.
1143 HIGHLAND DRIVE, SUITE B
ANN ARBOR, MI. 48108-2237
P.O. BOX 991 48106-0991
PHONE: 734-971-7080
FAX: 734-971-9022

DATA Drawing Name: J:\03868\22\38682205.dwg
Operator Name: lucidos
Scale: 1"=50'
Size: 42 Bytes
Plot Date: Wednesday, May 23, 2001
Plot Time: 07:10.4897 AM
Attached Xref's: No xref's Attached.